UTAH GEOLOGICAL SURVEY
a division of
UTAH DEPARTMENT OF NATURAL RESOURCES

Plate 1
Utah Geological Survey Miscellaneous Publication MP-99-4
Geologic Map of the Keg Pass Quadrangle

3363 I NE (DUGWAY RANGE NE)
3363 IV NE (COYOTE SPRINGS)
3463 IV NW (TABLE MTN.)
3363 I SE (DUGWAY PASS)
SIMPSON SPRINGS 16 MI.
SIMPSON SPRINGS 22 MI. (KEG MTN. RANCH) 3463 IV SE
ROCKWELL RANCH 31 MI.
3363 II (TOPAZ MTN.) 1:62 500
(PICTURE ROCK HILLS) 3463 III NW
(THE HOBBACK) 3463 III NE

Base map from U.S. Geological Survey
Keg Pass 7.5' Quadrangle, 1971

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

The Miscellaneous Publication Maps provide an outlet for authors who are not Utah Geological Survey staff. Not all aspects of this publication have been reviewed by the UGS.

14.1°
251 MILS
1999 MAGNETIC DECLINATION AT CENTER OF SHEET

UTAH
QUADRANGLE LOCATION

GEOLOGIC MAP OF THE KEG PASS QUADRANGLE, JUAB COUNTY, UTAH

by

Michael A. Shubat and Gary E. Christenson

1999

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Plate 2
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Geologic Map of the Keg Pass Quadrangle

DESCRIPTION OF GEOLOGIC UNITS

(Starred [*] names are newly proposed units)

Qal — Stream alluvium (Holocene) - Unconsolidated, poorly sorted clay, silt, sand, pebbles, cobbles and boulders in modern stream channels, floodplains, and terraces 3 to 6 feet (1 to 2 m) above modern channels; generally less than 10 feet (<3 m) thick.

Qes — Eolian sand (Holocene) - Unconsolidated, well-sorted sand, chiefly in stabilized dunes that are now being eroded; located below the Bonneville shoreline and derived from lacustrine deposits; generally less than 10 feet (<3 m) thick.

Qaf_1 — Younger alluvial-fan deposits (Holocene and latest Pleistocene) - Unconsolidated, poorly sorted clay, silt, sand, and gravel found principally below the Bonneville shoreline; generally less than 10 feet (<3 m) thick.

Qla — Undifferentiated lacustrine and alluvial deposits (Holocene and latest Pleistocene) - Unconsolidated sand, pebbles, and cobbles consisting of lacustrine deposits partially reworked by post-lacustrine streams and slope wash, pre-lacustrine alluvial-fan deposits partially reworked by Lake Bonneville, and alluvial and lacustrine deposits that cannot be differentiated at the map scale; rarely more than 10 feet (>3 m) thick.

Qac — Alluvium and colluvium (Holocene and Pleistocene) - Unconsolidated, poorly sorted clay, silt, sand, pebbles, cobbles, and boulders in first-order drainages, alluviated slopes below colluvium, and poorly developed alluvial fans; generally less than 10 feet (<3 m) thick.

Qmc — Colluvium (Holocene and Pleistocene) - Unconsolidated colluvium, and cobble- to boulder-sized talus on steep mountain slopes below rock outcrops; up to 30 feet (9 m), but generally less than 10 feet (<3 m) thick.

Qlg — Lacustrine gravel (latest Pleistocene) - Unconsolidated, sand, and pebble-sized gravel, with cobbles and silt, at and just below the Bonneville shoreline; up to 30 feet (9 m) thick.

Qls — Lacustrine sand (latest Pleistocene) - Unconsolidated sand, with clay, silt, and gravel; located below the Bonneville shoreline; up to 30 feet thick (9 m).

Qlm — Lacustrine marl (latest Pleistocene) - Unconsolidated, light-colored marl, and lesser clay, silt, and sand; includes ostracode- and gastropod-rich layers; exposed thickness 6 feet (2 m).

Qaf_2 — Intermediate-age alluvial-fan deposits (late to middle Pleistocene) - Unconsolidated, poorly sorted clay, silt, sand, pebbles, cobbles, and boulders above the Bonneville shoreline; fan surfaces are inactive and undergoing erosion, and up to 20 feet (6 m) above modern drainages; generally less than 20 feet (<6 m) thick.

QTaf — Older alluvial-fan deposits (early Pleistocene and Pliocene[?]) - Unconsolidated to semi-consolidated, poorly sorted clay, silt, sand, pebbles, cobbles, and boulders on the west flank of Keg Mountain above the Bonneville shoreline; original fan surfaces degraded and up to 60 feet (18 m) above modern drainages; at least 60 feet (18 m) thick. Designated as Qlg/QTaf where the deposit has been eroded and reworked by Lake Bonneville.

Ttm — Topaz Mountain Rhyolite (Miocene) - Divided into:

Rhyolite flows, domes, and intrusions - White, gray, and purple rhyolite containing sparse (10 to 15 percent), small (0.08 inch [2 mm]) phenocrysts of quartz and sanidine, and lesser plagioclase, biotite, and opaque mineral phenocrysts in a matrix of devitrified glass; black to brown vitrophyre at the base of some flows and domes; less than 6.7±0.3 Ma; maximum exposed thickness 590 feet (180 m).

Ttmt — Stratified tuff - Pale-tan to orange, very thick- to thin-bedded, nonwelded, lithic-rich rhyolitic tuff and volcanic sandstone; contains a variety of volcanic rock fragments, abundant pumice clasts, and sparse crystal fragments in an ash matrix; occurs as discontinuous water-laid and air-fall lenses beneath many rhyolite lava flows and domes; extensively zeolitized and feldspathically altered; up to 140 feet (43 m) thick.

Td — Dell Tuff (Oligocene) - Pink to tan, poorly to moderately welded, crystal-rich, rhyolitic ash-flow tuff; contains abundant 0.1 to 0.4 inch (2 to 10 mm) phenocrysts of quartz, sanidine, plagioclase, and biotite; up to 19 % lithic fragments; dated 32.0±0.6 Ma (average) by Lindsey (1982); maximum exposed thickness 350 feet (110 m), but maximum exposed thickness is 600 (180 m) in the Keg Mtn. Ranch quadrangle.

Trp — Rhyolite porphyry (Oligocene) - Small, pale-gray to pink, light-tan weathering, rhyolite porphyry dikes and plugs with large (up to 0.4 inch [1 cm]) phenocrysts of sanidine, quartz, plagioclase, and biotite in an aphanitic matrix; phenocrysts nearly absent near the margins of intrusions and become more abundant toward the interior; dated by Shubat and Snee (1992) at 35.14±0.15 Ma.

Tj — Joy Tuff (Oligocene) - Red-brown to pink, moderately to densely welded, rhyolitic ash-flow tuff; black vitrophyre locally present at base of unit and overlain by a black fiamme-rich zone; contains abundant, 0.04- to 0.31-inch (1- to 8-mm) phenocrysts of quartz, sanidine, plagioclase, and biotite, and as much as 14 percent lithic clasts; dated by Shubat and Snee (1992) at 34.88±0.06 Ma; maximum exposed thickness 80 feet (24 m), but maximum exposed thickness is 540 feet (160 m) in Picture Rock Hills quadrangle.

Tqm — Quartz monzonite (Oligocene and Eocene) - One or two, small, gray, rusty-weathering, porphyritic plug(s) containing 0.01- to 0.4-inch (0.3- to 10-mm) phenocrysts of plagioclase, biotite, quartz, hornblende, and potassium feldspar in a fine-grained matrix of potassium feldspar and quartz; contains sparse dark-green xenoliths; locally silicified and pyritized; not dated, but younger than Mt. Laird Tuff.

Tpd — Pebble dike (Oligocene and Eocene) - Small pipe containing argillized and iron-stained clasts of volcanic rocks, Paleozoic rocks, and intrusive rocks; matrix poorly exposed; not dated; but younger than Mt. Laird Tuff in Keg Mtn. Ranch quadrangle.

Tdp — Dacite porphyry (Oligocene and Eocene) - Small plugs of olive-green, propylitized dacite porphyry containing abundant, 0.08 to 0.4 inch (2 to 10 mm) phenocrysts of plagioclase, quartz, biotite, and hornblende in a fine-grained to aphanitic matrix; contains microphenocrysts of plagioclase, quartz and sanidine; dated by Shubat and Snee (1992) at 36.49±0.15 Ma and in this report at 36.2±1.4 Ma.

Tml — Mt. Laird Tuff (Oligocene and Eocene) - Lavender, pale-green, dark-green, and brown, moderately welded, dacitic ash-flow tuff, tuff-breccia and lapilli-tuff, and probable lava flows and hypabyssal intrusions; characterized by abundant, 0.08 to 0.47 inch (2 to 12 mm) phenocrysts of white plagioclase; other phenocrysts are hornblende, biotite, quartz, and clinopyroxene; vitrophyre locally present at base; dated by Shubat and Snee (1992) at 36.54±0.06 Ma; maximum exposed thickness 220 feet (67 m).

Tgd — Granodiorite porphyry (Oligocene and Eocene) - Light-olive-green to pinkish-green, holocrystalline stock containing 0.08 to 0.47 inch (2 to 12 mm) phenocrysts of plagioclase, quartz, biotite, hornblende, and clinopyroxene in a matrix of fine-grained quartz, plagioclase, and potassium feldspar; pervasive propylitic alteration; dated by Lindsey (1982) at 36.6±1.6 Ma.

Tk — Keg Tuff* (Oligocene and Eocene) - Dark red-brown to black, densely welded, moderately crystal-rich, dacitic ash-flow tuff; black vitrophyre locally present at base and locally within the unit separating cooling units; abundant, bronze-weathering biotite prominent on surfaces parallel to layering; also contains plagioclase, biotite, quartz, and hornblende phenocrysts; dated by Shubat and Snee (1992) at 36.77±0.12 Ma; maximum exposed thickness 540 feet (165 m).

Tdo — Dead Ox Tuff* (Oligocene and Eocene) - Divided into:

Lithic-crystal, ash-flow tuff member - Tan, orange, and pale-green, thick-bedded, moderately to poorly welded, dacitic ash-flow tuff; contains abundant lithic fragments, 0.04 to 16 inches (0.1 to 40 cm) in diameter, of quartzite, limestone, black phyllite, andesite, and pumice; slightly flattened pumice fragments impart a crude layering to the rock; phenocrysts consist of plagioclase, quartz, and biotite; argillic alteration common; coarse, lithic-rich parts weather to cobble- and boulder-strewn slopes, with little exposed matrix; maximum exposed thickness 60 feet (20 m).

Tdom — Megabreccia member - Clasts of Prospect Mountain Quartzite, Pioche Formation, undifferentiated Lower Paleozoic limestone, conglomerate, andesitic lahar, and andesite in a poorly exposed matrix of poorly welded tuff similar to the lithic-crystal, ash-flow tuff member; clasts are less than 1 foot to 800 feet (<20 cm to 240 m) in diameter, most are 10 to 200 feet (3 to 60 m) in diameter; nearly all quartzite and some limestone clasts are intensely and pervasively brecciated, often supported with a fine-grained matrix of comminuted material; not dated, intruded by dacite porphyry and contains clasts of andesite of Keg Pass; maximum exposed thickness 280 feet (85 m).

Tdow — Stratified tuff member - Poorly exposed, tan to orange, thin-bedded to laminated volcanic sandstone and siltstone, and tuff; sand-sized crystal fragments consist of quartz, plagioclase, and biotite; lithic fragments consist of quartzite, limestone, and volcanic rock; argillic alteration common; not dated, but intruded by dacite porphyry and overlies andesite of Keg Pass; apparently less than 40 feet (12 m) thick.

Tap — Andesite porphyry (Eocene) - Small plugs of dark-brown to black, brown-weathering andesite porphyry containing phenocrysts of plagioclase, biotite, hornblende, and quartz in an aphanitic matrix; chemically dacitic; not dated but intrudes andesite of Keg Pass and overlain by Keg Tuff.

Ta — Andesite of Keg Pass (Oligocene and Eocene) - Heterogeneous, dark-colored flows and less abundant lahars; flows contain phenocrysts of andesine, biotite, hornblende, quartz, clinopyroxene, and magnetite in a trachytic matrix; some flows contain plagioclase crystals as long as 0.6 inches (15 mm); lahar commonly at base of unit and contains clasts of andesite, quartzite, limestone, and (locally) Mt. Laird Tuff; propylitic alteration common; age variable but as old as 39 and as young as 37 million years old; maximum exposed thickness 200 feet (60 m).

TKc — Unnamed conglomerate (Tertiary and/or Cretaceous) - Consists of well-rounded pebbles and cobbles of quartzite, chert, and limestone in a gray-green, sandy to silty matrix; poorly exposed; maximum exposed thickness 40 feet (12 m).

Cl — Undifferentiated Cambrian carbonate rocks - Light- to dark-gray, medium- to thick-bedded, biosparite limestone with minor shale and intraformational conglomerate interbeds; exposed in footwall of thrust faults; correlation uncertain, but is probably part of the Middle Cambrian Howell Limestone, Chisholm Formation, Dome Limestone, Whirlwind Formation, or Swasey Limestone; exposed thickness up to 200 feet (60 m).

Ch — Howell Limestone (Cambrian) - Light- to medium-gray, medium- to thick-bedded, biosparite limestone; in the Table Mountain quadrangle contains intercalations of olive-green-gray phyllite at the base of the unit; estimated thickness 400 feet (120 m).

Pioche Formation (Cambrian) - Divided into:

Cpt — Tatow Member - Thick- to medium-bedded, mottled orange-brown, oncolitic dolomite and white to gray oncolitic limestone; forms low cliffs; thickness uncertain, but up to 94 feet (29 m) measured in Slow Elk Hills.

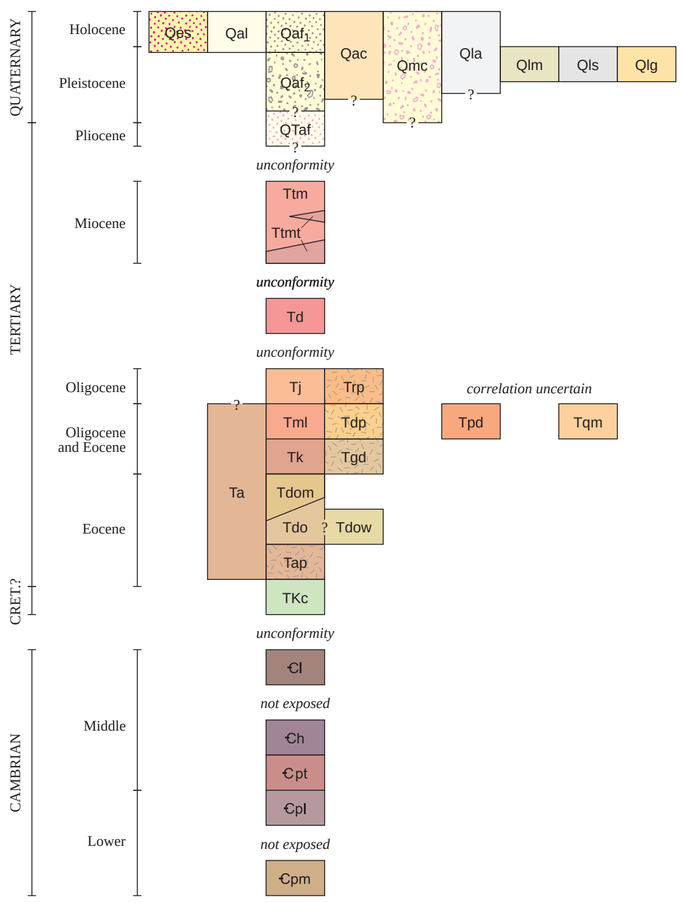
Cpl — Lower member - Contains medium-bedded, dark-green to black, ledge-forming quartzite, thin-bedded, dark-olive-green to black phyllitic quartzite, and dark-olive-green phyllite; occurs as thin slivers between thrust faults; quartzite dominates in the lower part and phyllite in the upper part; rusty weathering; thickness uncertain, but 287 feet (88 m) measured in Slow Elk Hills isn't a maximum thickness.

Cpm — Prospect Mountain Quartzite (Cambrian) - Pinkish-gray to tan, rusty-weathering, medium-grained, thick-bedded quartzite with small-scale cross-bedding in the upper plate of a thrust fault; pervasively brecciated in most exposures; thickness uncertain, but estimated at 820 feet (250 m) in the Slow Elk Hills.

STRATIGRAPHIC COLUMN

SYSTEM	SERIES	FORMATION / MAP UNIT	SYM-BOL	THICKNESS Feet (Meters)	LITHOLOGY
QUAT.	Holocene / Pleistocene? / Pliocene?	Quaternary deposits	Q	0-30 (0-9)	
		Older alluvial-fan deposits	QTaf	0-60+ (0-18+)	*unconformity*
TERTIARY	Miocene	Topaz Mountain Rhyolite: Rhyolite flows, domes, and intrusions	Ttm	0-590 (0-180)	Ttmt
		Topaz Mountain Rhyolite: Stratified tuff	Ttmt	0-140 (0-43)	*unconformity*
	Oligocene	Dell Tuff	Td	0-350 (0-110)	~32-34 Ma
		Joy Tuff	Tj	0-80 (0-20)	*unconformity* Avg. 34.88 ± 0.06 Ma
		Mt. Laird Tuff	Tml	0-220 (0-67)	Avg. 36.54 ± 0.06 Ma
		Keg Tuff	Tk	0-540 (0-160)	36.77 ± 0.12 Ma Ar-Ar
	Oligocene and Eocene	Dead Ox Tuff: Megabreccia member	Tdom	0-280 (0-85)	
		Dead Ox Tuff: Lithic-crystal tuff mbr	Tdo	0-60 (0-18)	*not exposed*
		Dead Ox Tuff: Stratified tuff mbr	Tdow	0-40 (0-12)	
		Andesite of Keg Pass	Ta	0-200 (0-60)	~37-40 Ma, but see correlation chart for probable range in age of Andesite of Keg Pass
TERTIARY and CRETACEOUS		Unnamed conglomerate	TKc	0-40 (0-12)	*unconformity*
		Undifferentiated carbonate rocks	Cl	200 (60)	
CAMBRIAN	Middle				*not exposed*
		Howell Limestone	Ch	400+ (120+)	Thrust sheet-overlies younger Cambrian unit
	Lower	Pioche Fm.: Tatow Member	Cpt	94 (29)	
		Pioche Fm.: Lower member	Cpl	287+ (88+)	*not exposed*
		Prospect Mountain Quartzite	Cpm	820+ (250+)	Thrust sheet-overlies younger Cambrian units

CORRELATION OF GEOLOGIC UNITS



MAP AND CROSS SECTION SYMBOLS

- Contact, dotted where covered, dashed and queried on cross sections where diagrammatic.
- High-angle fault, dashed where location inferred, dotted where covered, bar and ball on downthrown side, dip indicated where measured, arrows show direction of movement on cross sections, dashed and queried on cross sections where diagrammatic.
- Thrust fault, dotted where covered, teeth on upper plate, dashed and queried on cross sections where diagrammatic.
- Air-photo lineament, probable location of high-angle fault.
- Anticlinal axis, dotted where covered.
- Synclinal axis, dotted where covered.
- Bonneville shoreline
- Provo shoreline
- A — A′ Line of cross section
- Strike and dip of bedding
- Strike and dip of layering in volcanic rocks
- Dike
- KP-6-5 Location of sample analyzed in this study (results in table 1 and appendices)
- Prospect